

CLAIMS

What is claimed is:

1. An apparatus for analysing at least one sample in an array of samples, the apparatus comprising:
 - 5 (a) an image recorder that records the position of the at least one sample relative to the other samples in the array;
 - (b) a dispensing device that applies a reagent or sequence of reagents to the at least one sample *in situ*;
 - (c) an analyser that analyses the at least one sample for a reaction to or with the reagent or the sequence of reagents; and
 - 10 (d) a chemical dispensing control unit that controls the dispensing device, which applies the reagent or the sequence of reagents to the at least one sample according to the position of the at least one sample relative to the other samples in the array determined by the image recorder.
- 15 2. The apparatus according to claim 1 further including a recorder of the analysis results obtained by the analyser.
3. The apparatus according to claim 1 wherein the image recorder is selected from the group consisting of scanner, photodetector, and charge-coupled device.
4. The apparatus according to claim 1 wherein the dispensing device is a chemical printer adapted to apply one or more reagents to the at least one sample.
- 20 5. An apparatus for analysing at least one sample in an array of samples, the apparatus comprising:

- (a) an image recorder that records the position of the at least one sample relative to the other samples in the array;
 - (b) a fluid source,
 - (c) a fluid delivery and sampling device that delivers fluid to a sample in the array and that samples fluid applied to the sample on the array,
 - (d) an extraction device that retains a reaction product(s) from a sample on the array;
 - (e) a fluid control device that controls fluid movement from the fluid source to the fluid delivery and sampling device and that controls fluid movement from the sample to the extraction device via the fluid delivery and sampling device; and
 - (f) an analyser that detects the product.
6. The apparatus according to claim 5 wherein the fluid control device is a 3-way valve.
- 15 7. The apparatus according to claim 5 wherein the fluid control device comprises a first control device for the fluid delivery and sampling device and a second control device for the extraction device.
8. The apparatus according to claim 7 wherein the first and second control devices are piezoelectric control devices.
- 20 9. The apparatus according to claim 5 wherein the fluid is a reagent that reacts with a sample to produce a detectable product capable of being retained by the extraction device.
10. The apparatus according to claim 5 wherein the extraction device is a cartridge of chromatography packing.

11. The apparatus according to claim 1 wherein the analyser is selected from the group consisting of liquid chromatograph, photoelectrical detector, photochemical detector, laser detector, radiochemical detector, and mass spectrometer.
- 5 12. The apparatus according to claim 1 wherein the chemical dispensing control unit is a computer programmed to control the dispensing device.
13. The apparatus according to claim 1 wherein the array of samples is on a semi-solid or substantially solid support.
14. The apparatus according to claim 13 wherein the at least one sample analysed
10 has an area less than 100 mm².
15. The apparatus according to claim 13 wherein the at least one sample analysed has an area less than 50 mm².
16. The apparatus according to claim 13 wherein the at least one sample analysed has an area of 1 to 10 mm².
- 15 17. The apparatus of claim 1 wherein the dispensing device is a jetting device.
18. The apparatus of claim 1 wherein the analyser is a MALDI-TOF spectrometer or LDI-TOF mass spectrometer.
19. The apparatus of claim 1 wherein the image recorder is an image acquisition system comprising a digital camera and a computer.

20. The apparatus of claim 5 wherein the image recorder is an image acquisition system comprising a digital camera and a computer.
21. The apparatus of claim 1 wherein the image recorder is a charge-coupled device.
22. The apparatus of claim 5 wherein the image recorder is a charge-coupled device.
- 5 23. The apparatus of claim 5 wherein the reagent is an antibody, an extraction solution, or an enzyme.
24. The apparatus of claim 5 wherein the array is positioned on an x, y, z adjustable table.
25. The apparatus according to claim 4 wherein the chemical printer is controlled by
10 a program.
26. The apparatus according to claim 1 wherein the image recorder comprises a charge-coupled device.